

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A radial turbine comprising:

an outer casing;

a scroll mounted inside the outer casing which forms a first part of a combustion gas flow path for guiding a combustion gas generated in a combustor to a nozzle; ~~a nozzle~~ which injects the combustion gas to a radial impeller on an inner side in a radial direction of a rotary shaft; and

a shell which covers the nozzle and the impeller and forms a second part of the combustion gas flow path; ~~characterized by comprising:~~

an airtight air flow path formed between outside air in a substantially airtight state inside the casing;

an air take-in hole which takes in air into the air flow path from the outside;

a combustor outer cylinder mounted outside the outer casing;

a combustor liner mounted inside the combustor outer cylinder, which is communicated with the scroll and guides the combustion gas into the scroll;

a blow-off hole which guides a first part of the air taken into the air flow path, into the combustor liner; and

~~a through hole which injects the other part of the air taken into the air flow path to a vicinity of the nozzle in the combustion gas flow path~~

through holes extending through the shell from the air flow path on both sides of the nozzle adjacent a front edge of the nozzle and inclined at an angle toward a direction of flow of the combustion gas to inject a second part of the air taken into the air flow path into the combustion gas passing through the nozzle.

2. (Original) The radial turbine according to claim 1, characterized in that the air flow path is formed to cover an outer side of the combustion gas flow path communicating from the combustor to the shell.

3. (Currently Amended) The radial turbine according to claim 1 characterized in that the air flow path is formed to cover an outer side of the combustion gas flow path communicating from the combustor to the shell, and the through-holes are is formed in a wall walls of the shell ~~to communicate between the air flow path, and an at a portion~~ upstream of the nozzle ~~of the combustion gas flow path.~~

4. (Canceled)

5. (Currently Amended) The radial turbine according to claim 1, characterized in that a plurality of the through-holes are arranged in parallel along a ~~flowing~~ direction of flow of the combustion gas flow path.

6. (Currently Amended) The radial turbine according to claim 1, characterized in that the nozzle includes a circular blade cascade in which a number of blades are arranged in a row in ~~the~~ a circumference thereof and of which a center

is a turbine rotary shaft, and ~~each~~the through-holes includes a plurality of shell through-holes along a surface of each blade of the circular blade cascade.

7. (Canceled)

8. (Canceled)

9. (Original) The radial turbine according to claim 1, characterized by further comprising: a through-hole which leads from one side of the air flow path sandwiching the combustion gas flow path to the other side of the air flow path while penetrating a wall of the shell, a blade thick portion of the nozzle and a wall of the shell on the other side; and a leakage hole which leads from the blade thick portion of the nozzle of the through-hole to a surface of the nozzle.

10. (Currently Amended) A radial turbine comprising:

an outer casing;

a combustor liner in which ~~mixes and combusts~~ compressed air and a fuel are mixed and combusted to generate a combustion gas;

a turbine scroll which forms a first part of a combustion gas flow path for supplying the combustion gas generated in the combustor liner to a turbine nozzle; ~~a turbine nozzle~~ which accelerates the combustion gas toward an inner side in a radial direction of a rotary shaft and supplies the combustion gas to a radial turbine compeller; and

a turbine shell which covers the turbine nozzle and the radial turbine impeller;
~~characterized by comprising;~~

an airtight air flow path formed ~~between outside air in a substantially airtight~~
state inside the outer casing;

an air take-in hole which takes air into the air flow path from the outside;

a combustor outer cylinder mounted outside the outer casing, said combustor
liner being mounted inside the combustor outer cylinder and being communicated
with the scroll to guide the combustion gas into the scroll;

a blow-off hole which guides a first part of the air taken into the air flow path,
into the combustor liner; and

~~a through hole which injects the other part of the air taken into the air flow~~
~~path to a vicinity of the nozzle in the combustion gas flow path.~~

through holes extending through the shell from the air flow path on both sides
of the nozzle adjacent a front edge of the nozzle and inclined at an angle toward a
direction of flow of the combustion gas to inject a second part of the air taken into the
air flow path into the combustion gas passing through the nozzle.

11. (Currently Amended) The radial turbine according to claim 10,
characterized in that the air flow path is formed by a ~~turbine~~the casing so as to cover
an outer side of the combustion gas flow path communicating from the combustor to
the shell ~~and to maintain air tightness with respect to the outside air.~~

12. (Currently Amended) The radial turbine according to claim 10,
characterized in that the air flow path is formed to cover an outer side of the

combustion gas flow path communicating from the combustor to the shell, and the through-holes ~~is~~are formed in ~~a wall~~the walls of the shell ~~to communicate between the air flow path, and an~~ at a portion upstream of the nozzle ~~of the combustion gas flow path.~~

13. (Canceled)

14. (Currently Amended) The radial turbine according to claim 10, characterized in that a plurality of the through-holes are arranged in parallel along a ~~flowing direction~~ of flow of the combustion gas flow path.

15. (Currently Amended) The radial turbine according to claim 10, characterized in that the turbine nozzle includes a circular blade cascade in which a number of blades are arranged in a row in ~~the~~ a circumference thereof and of which a center is a turbine rotary shaft, and the through-holes includes a plurality of turbine shell through-holes arranged along a surface portion of each blade of the circular blade cascade.

16 -17. (Canceled)

18. The radial turbine according to claim 10, characterized by further comprising: a through-hole which leads from one side of the air flow path sandwiching the combustion gas flow path to the other side of the air flow path while penetrating a wall of the shell, a blade thick portion of the nozzle and a wall of the

shell on the other side; and a leakage hole which leads from the blade thick portion of the nozzle of the through-hole to a surface of the nozzle.

19. (Currently Amended) A method of cooling a nozzle of a radial turbine including the steps of:

guiding a combustion gas from a combustor liner mounted inside of a combustor outer cylinder mounted outside an outer casing, to a nozzle through a combustion gas flow path including a scroll communicated with a combustor liner; and

injecting the combustion gas to a radial impeller on an inner side in a radial direction from the nozzle, ~~comprising the steps of:~~

taking in air from the outside into an airtight air flow path formed outside the combustion gas flow path ~~in a substantially airtight state with respect to outside air~~;

guiding a first part of the air taken into the air flow path, to the combustor; and

injecting ~~the other~~ a second part of the air taken into the air flow path, ~~to a vicinity of the nozzle in the combustion gas flow path into the combustion gas at a position on both sides of the nozzle adjacent a front edge of the nozzle at an angle inclined toward a direction of flow of the combustion gas.~~

20. (Currently Amended) The method of cooling a nozzle of a radial turbine according to claim 19, characterized in that the step of injecting the second part of the air to the vicinity on both sides of the nozzle in the combustion gas flow path includes a step of injecting the ~~other~~ second part of the air along a surface of a blade forming the nozzle.